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Montana State Board *of* Health

SPECIAL BULLETIN No. 5

FREEDOM FROM FILTH
FREEDOM FROM FLIES

"THERE ARE NO FLIES ON ME"

STATE OF MONTANA

SPECIAL BULLETIN

——OF THE——

Department of Public Health

MONTANA STATE BOARD OF HEALTH

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Helena, April 2, 1916

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"A CLEAN ALLEY"

"CLEAN UP"

The mission of this bulletin is to aid in effective clean-up campaigns in the different towns of the State. A clean town, with a pure water supply and a properly regulated milk supply means a healthy town.

A dirty town, with alleys full af garbage and manure piles, is sure to have an abundance of flies. Flies are one of the main causes of diarrhoeal diseases in babies, as well as typhoid fever and other diseases in adults. If you have a clean town you prevent the breeding of flies. If you prevent the breeding of flies, you will save the lives of many babies. Isn't this worth while?

In the name, and for the sake of the babies of the state, we appeal for help in this clean-up campaign from the Women's Clubs, the labor organizations, lodges and business organizations. There are scores of infants die every summer from preventable diseases. There are scores of them die because we, as individuals and as citizens, are not doing our full duty by them. It is useless to grieve over past indifference and carelessness in health matters, but let us act in the living present. By a properly organized effort we can reduce our infant mortality one-half during the coming summer, and we can eliminate entirely epidemics of typhoid fever. Let us get busy.

Is your local Health Department active in health matters? We venture to say it is just as active as is the public sentiment of your community.

Are you sufficiently interested in your child's welfare to take the trouble to find out whether your milk comes from a manure pile or a clean dairy?

As long as your standard for buying milk is the greatest number of quarts for a dollar, just so long will you have dirty dairies. Clean and conscientious dairymen have more than once been put out of business by a dirty dairyman and dirty public sentiment.

We will have clean dairies in this State just as soon as the people show that they want them. While a dirty milk sells as well as a clean milk, a dirty milk you will get. It costs less to furnish it.

God Almighty will not furnish you pure milk unless you make some effort yourselves.

We show in this bulletin the cut of a clean, paved alley taken in one of the towns of the State. Can such a photograph be taken in your town?

Take care of the alleys and the streets will take care of themselves.

If cleanliness is next to Godliness, then Satan is pretty close to some of our towns.

Every town should have a proper garbage collecting and disposal system. Tin cans should be buried and garbage burned. A properly constructed incinerating plant should be constructed in every town.

Spasmodic cleanliness is better than no cleanliness at all. But it is cleanliness all the time that makes most for health, happiness and freedom from disease.

It costs less to keep well than to get well. Flies injure more people in a week than railroads injure in a year. Safety first. Swat the fly. The only good fly is a dead fly.

WOMEN'S CLUBS IN CIVIC WORK.

By Margaret Hughes, R. N.

Spring house cleaning is a routine event in the cycle of home life. In some homes it is carried on so methodically as to be of little inconvenience. In other homes it is accomplished by an upheaval of law and order, a reign of chaos. Women are tired and irritable, men are driven to a little extra stimulation.

Municipal housekeepers are beginning to conduct spring clean-up campaigns. These are just as necessary for community health as is the home cleaning for family health. Some towns and cities conduct these campaigns with a hustle and a bustle, and in a few weeks the last state of that town is worse than the first. Other cities have conducted their campaigns in a business-like manner, making them educational in the principles of sanitation and hygiene. Such work tends to lasting improvement in order and cleanliness, and reacts favorably on the health and living conditions of the community.

Some states have had a state-wide campaign for clean-up, the work being inaugurated by the State Department of Health and aided in towns and cities by a proclamation of the Mayor, by organizations of business men, or by women's clubs. Experience is proving that, no difference by whom the work is started, all welcome the co-operation of women's clubs, because they secure results, and because they have the power and gift of making the towns and cities great community homes, clean, wholesome and attractive for all the people. Some towns will be dependent on the women's clubs for their clean-up york.

The town may be too small to be incorporated, or if incorporated, may be unfortunate in having a Mayor indifferent to all health measures.

It may not have a business man's organization, or if such an orgonization exists, it may not be imbued with the civic sense of relationship of community cleanliness and community health.

The health officer may see clearly the need of such work, but he has not the time to push it vigorously. The pittance doled to him for health work will not keep the wolf

from the door. He is dependent on his medical practice for a livelihood. If he does his full duty as a health officer, he will lose friends and patients and earn the title of crank and faddist.

In all such towns or cities let us hope there is a Woman's Club with a strong civic department that will inaugurate the campaign, and get **things done**.

A program for Clean-Up Week, and an account of how the movement has been successfully conducted in other cities will be found in this bulletin, and may prove of assistance to clubs initiating the work.

The campaign for a cleaner city must not end with Clean-Up Week, but go on throughout the season.

We have state laws and local ordinances covering milk, water, food supplies, sewage and garbage disposal, street cleaning and such matters. Are these laws and ordinances enforced as they should be? If not, why not? The only answer to these questions is, because they have not public sentiment back of them. Let us take the milk supply as an example. The County Health Officer in inspecting dairies, finds some that score under 70, which is the minimum standard. He notifies the proprietor. Next month the score is found below standard again, and another notice served. The third month the same process takes place. Why don't the health officer bring proceedings against the man and force him to clean up his dairy? That is the obvious duty of the health officer, but would public sentiment back him?

The proprietor may have a good following of friends who would set up a hue and cry against the meddlesome health officer if he dared to file complaint against this insanitary dairy.

The health officers are given power or their hands are tied according to the degree of enlightenment of public sentiment.

If Montana women want a clean milk supply, let them, through their organizations, back the enforcement of our laws and ordinances.

A health officer, in a county of Montana, served many notices on the owner of an insanitary slaughter house. The man had strong political influence and not only paid no heed to the notices, but laughed openly at the physician. The health officer desired to do his duty in protecting public

health, but he knew the public would not stand by him in his efforts. A practical way presented itself to him for solving the problem.

He secured a committee from the Woman's Club to accompany him on an inspection trip. One place visited was this insanitary slaughter house. Those ladies became eye witnesses (and, we might add, olfactory as well) to the conditions of filth that existed on those premises.

The health officer never served another notice on Mr. Blank. It was not necessary. Those ladies spread abroad what they had seen, and when they or their friends went marketing, the first question was, "Where do you get your meat?" If from the slaughter house of Mr. Blank, they withdrew their trade, not failing to state their reasons for so doing.

What was the result?

Mr. Blank knew he was against a power he could not combat, and that power was enlightened public sentiment. He pulled down his old buildings of filth and stench and erected others which were models in sanitation and conveniences.

If the moral of this story is applied to dairies it will result in a pure milk supply.

The marketing of foods is an important matter. Is there a law or ordinance demanding that food stuff, not to be cooked before eating, should be covered or screened when on display? Such a law would not be necessary if the women of a community made the proper stand on this question. No one relishes dust-laden food, or food on which flies have wiped the putrid substance of their feet or regurgetated the filth of their stomachs. In speaking of this, a physician said: "Of course, this does not often kill you—it doesn't always make you sick. But neither does every bullet in battle kill someone. In fact, the figures show that in the average battle more than 1,500 shots are fired for every soldier that is struck. Yet the fatalities in a battle run into the thousands, and the fatalities of a fly-ridden district will mount up in the course of a season. You may have your food poisoned by the dangerous little fly a thousand times without serious results, but you can never tell when the poison will strike home; it is too risky to take chances."

Not only use screens, swatters and traps, but see that the breeding places for flies are cleaned up and kept clean.

There will not be untidy stable yards with piles of manure and swarms of flies if the owners of such places realize public sentiment is back of the health department.

The dust question is of vital importance. It makes house work a drudgery and spoils clothes, but what is still worse, when we breathe in the dust-laden air of our city streets, we are inhaling the dried and pulverized excretions of the nose, throat and lungs of many a passer-by. The sunlight may have acted like a disinfectant, but it may not. But disinfected or not disinfected, who wants to breathe in such substances? If streets were properly cared for, and a good ordinance enforced on the expectorating on streets, much of the influence, colds, throat and lung trouble would be eliminated.

Quoting from "The American City," one finds Women's Clubs throughout the country accomplishing **work worth doing.**

Winthrop, Maine.

"Our Club has maintained and run a street sprinkler in town since 1910."

Mt. Vernon, N. Y.

"Our Club started the first play ground in our city in one of the yards belonging to the public school. So great a success was this project that the Mayor appointed a playground commission to carry on the work. The Board of Education has since assumed the responsibility of this work and we have five fine playgrounds, each with a paid supervisor."

Clinton, N. C.

"The Mayor had endeavored in previous years to institute a general clean-up movement, but some of the people were indifferent, and some were resentful. This year our Civic League meetings brought the people to a proper understanding in regard to insanitary conditions and our town is cleaner than ever before."

Minneapolis, Minn.

"Through the twenty-five committees of our Woman's Club we give attention to such interests as pure milk, school sanitation, child welfare, smoke and billboard nuisances, clean streets, home economics, industrial art, etc. We aim to put

to active work the hands and heads of representatives of all kinds and varieties of women."

We could go on quoting indefinitely, but we believe it would be impossible to find more splendid achievement than has been wrought by the club women of Montana.

To them we owe the foundation of our tuberculosis work in this State.

To them we owe many civic improvements, and to them will, no doubt, be due a large measure of the 1916 Clean-Up campaign.

BACK YARDS AS GARDEN PLOTS.

States, cities and towns have devised schemes for converting the waste land of the back yards and vacant lots into garden spots. They have organized Junior Civic Clubs and Agricultural leagues among school children, and the results have proved most gratifying. The youthful gardeners were given healthful and pleasurable outdoor exercise; they felt the satisfaction of being producers; and many unsightly spots were converted into interesting, growing plots.

The record reached by the state girls' gardening and canning clubs in 1915 has given Montana agriculturists food for thought and opened the eyes of many a housewife to the profit of the home garden patch.

Miss Grace and Opal Holt, aged 15 and 16, students of the Deer Lodge High School, ranked first in this work in a membership of 1,200 girls. Each sister tilled one-tenth of an acre—about the size of an ordinary town lot. The younger sister cleared $148.52 from her garden, a profit of $1,485 per acre. Her sister cleared $108.86.

Miss Augusta E. Evans, state organizer of boys' and girls' clubs for the Montana State College and the United States Department of Agriculture, believes the membership will receive a great impetus from the interest aroused by so successful a season. It is hoped the membership will reach 2,500 in 1916.

We watch the growth of such clubs with interest and trust their progress and development will continue on such constructive lines.

"We Must Fight—TOGETHER!"

PROGRAMME FOR CLEAN-UP WEEK.

The following program has been used in several cities with good results:

Monday—Fire Prevention Day, devoted to cleaning up indoors, ridding attics and cellars of accumulations of household rubbish that might cause fire.

Tuesday—Back Yard Day, devoted to cleaning up the back yard.

Wednesday—Front Yard Day, devoted to cleaning up the front yard.

Thursday—Paint Day. Piazza chairs, furniture and small jobs that property owners can attend to themselves. The city may paint fire plugs, and light companies the lamp posts.

Friday—Fly and Dandelion Day; attention given to screening windows; garbage receptacles, collection and disposal;

eradicating fly breeding places, and ridding lawns of dandelions.

Saturday—Children's Day, which the school children, Boy Scouts and Junior Civic League assist in cleaning vacant lots and open areas.

CONDUCTING A CLEAN-UP CAMPAIGN.

A clean-up campaign, to be successful, depends on efficient co-operation between city officials, business men's organizations, women's clubs, school children and newspapers. It must be a community work in which all citizens feel an interest and responsibility. It must reach every part of the city and find no class distinction in those who promote or participate in the movement.

The work may be inaugurated by the city or by a club. If a club takes up the work, it is well as a first step to secure the backing of the city authorities. The Mayor will then issue a proclamation setting aside a date for Clean-Up Week, and calling upon the citizens for co-operation in the work. The Street Commissioners will make arrangements for removal of rubbish collected during Clean-Up Week.

The club must create public interest. It is advisable to write a letter, or send a representative to present the subject and give a clear understanding of the undertaking to every club and organization in the city, and give them a form of resolution to be passed at their next meeting pledging their support and co-operation.

A mass meeting is then called and committees appointed on finance, posters and printed matter, vacant lots, fire protection, schools and school children, window decoration, advertising and churches. Each committee will attend to certain duties under the direction of a central committee.

The Finance Committee will launch plans for raising funds to meet necessary expenses, as printing, etc.

The Press Committee will furnish material for newspaper publicity.

The Vacant Lot Committee will enlist the Boy Scouts, school children and business men's organizations in a war on the unsightly condition of vacant lots.

The Committee on Window Decoration should furnish attractive posters or window cards to groceries, hardware and all stores and ask the firms to make a window display of clean-up articles.

The Advertising Committee will persuade business houses to give publicity to clean-up work through their advertisements, as of paints, rakes, mops, etc.

The Committee for Churches will ask the ministers to give enlightenment on the necessity of the work, and how cleanliness reacts on the moral and health conditions of the community.

The Committee on Schools and school children will enlist the co-operation of the Superintendent of the schools, who will secure the interest of school children. It is a good opportunity for creating civic consciousness in the future citizens.

In order to give greater publicity to the work, folders are distributed, attractive cards are used on street car fenders, slides are provided for moving picture shows, streamers for wagons and horses, stickers for letters and packages; before and after pictures are displayed, etc.

Philadelphia has had two successful clean-up campaigns. In 1915 the work received such tremendous impetus as to be carried on into the second week, and it was estimated sufficient rubbish was removed to fill a city lot 300 by 300 feet to a height of 40 feet, or to the top of a three-story building.

The work was inaugurated by a committee appointed by the Mayor from city departments, composed of Assistant Engineer of Bridges and Sewers, one member from the Fire Department and a third from the Bureau of Health. The Chamber of Commerce named a large representative committee to co-operate with the City Committee. The response of the citizens exceeded all expectations.

The Civic Club of Kewanee in 1915 undertook a clean-up campaign. The plans for the work were comprehensive in nature and successfully carried out. With the co-operation of the Superintendent of Schools, a Junior Civic Club, consisting of 650 members, was organized in seven school districts of the city. The members of this club signed this card:

> I want to help make our town a better place to live in, and to this end I promise to comply with the following rules to the best of my ability:

1. I will help clean up yards, streets and alleys.

2. I will plant flower seeds, vines, bulbs, shrubbery, etc.

3. I will help make gardens, and keep lawns in good condition.

4. I promise not to deface fences or buildings; neither will I scatter rubbish in public places.

5. I will not spit upon the floor of any public building or on the sidewalk.

6. I will try to influence others to help to keep our town clean.

7. I will always protect birds and animals, and all property belonging to others.

8. I promise to be a true, loyal citizen.

I may not be able to do all these things, but will do as much as I can to help our town and community.

Prizes were offered, score cards prepared and committees appointed to act as judges in a contest for progress for cleaning up yards at home, planting flowers, making gardens, etc., in the seven districts. This contest gave pleasure, healthful exercise and enthusiasm to the children and worked wonders for the improvement and beautifying of the city.

So many cities and towns have worked out successful plans for this work that no town or city, club or organization now taking up the work need do so as an experiment, but, guided by the light of experience of others, may take it up in the assurance of success, providing co-operation is secured.

HIS CHOICE.

Bishop Olmstead was talking about boy nature. "I once said to a little boy: "Do you know the parables, my child?"

" 'Yes, sir,' he replied.

" 'And which of the parables,' said I, 'do you like best?'

" 'I like the one,' he answered, after a moment's thought, 'where somebody loafs and fishes.' "

Who Says "DON'T"?

WHO SAYS DON'T?

Clean up, and keep clean. It prevents disease; it protects life; it promotes pride and self-respect in a community and stimulates business activities.

Who says don't?

Don't clean cellars and attics.

Don't clean streets and alleys.

Don't clean yards and corrals.

Don't fight flies.

Don't look after sewage or garbage.

Who says don't? Not a voice is raised in protest. Clean-up is welcomed whether it be a day, a week, a month or a whole season. Every citizen wants a clean home, a clean yard and a clean neighborhood.

Who could be so blind as to oppose measures which result in our well being, physically and morally, educationally and industrially?

But there is an influence more deadly to such a campaign's success than honest and outspoken opposition. It comes from the complacent citizen who says: "Yes, a clean-up campaign is just the thing. I tell you **they** need it in the next ward." It comes from the indifferent citizen who says: "**They** are going to have a clean-up campaign week in our town. It will be a great success. The Health Officers will looks after it, you know." It comes from the selfish citizen and knocker, who says: "This clean-up campaign is none of my business. That is the job of the city or Board of Health, and anyone could do better than **they**."

Don't shift your personal responsibility in this matter because of complacency, indifference or selfishness. Remember the little verse:

Why don't they keep the streets a little cleaner?
You ask with deep annoyance not undue,
Why don't they keep the lawns a little greener?
Did you ever stop to think that **they** means **you**?

PROTECTION OF PUBLIC AND PRIVATE WATER SUPPLIES.

By W. M. Cobleigh, Chemist State Board of Health.

In spring, "clean-up" campaigns, conducted for the purpose of protecting the health of the community, all forms of contamination and befoulment that have been allowed to collect in winter months are removed to places where such material will not be a menace to public health. Changes from the frozen conditions of winter to the thaws and freshets of spring make some sources of contamination a menace to the purity of certain public and private water supplies unless they are adequately protected.

It is the purpose of this article not only to give the basis upon which the purity of drinking water should be judged, but also to give a basis for determining when a water supply is adequately protected from sources of contamination.

With such information there can be in each community of the state wisely directed efforts towards keeping the water supply in a satisfactory condition from the sanitary aspect. Opinions regarding how such protective measures should be carried out cannot differ materially when the principles of sanitary science, as they relate to water, are understood.

The chief water-borne diseases that we need to fear in Montana are typhoid fever and dysentery. Tyhpoid fever is caused by the presence of minute plants, known as typhoid germs, in the human body.

Typhoid germs come from persons and only from persons.

Tyhpoid germs come from persons who suffer from typhoid fever and also from some persons who are apparently in good health.

Typhoid germs are discharged from the bodies of infected persons in the excretions from the bowels and kidneys.

Tyhpoid fever is preventable by practical measures which prevent human excreta from reaching the mouths of persons.

Proper disposal of human excreta will prevent not only typhoid fever and dysentery, but also other diseases, and constitutes, for any community, one of the best possible investments.

Therefore, a water is satisfactory from the sanitary aspect when it is delivered to the consumer under conditions which make it impossible to contain unpurified human excreta, and for further protection it should not contain excreta of farm animals. These facts give the basis for forming opinions on the probable safety of water supplies taken either from stream or from wells.

Surface Waters.

Intakes Above Habitations: In the light of the above statements it is plain that if a surface water is to be considered perfectly safe, and one that can be recommended for public consumption, the intake delivering water to the system should be above all possible sources of contamination. The watershed from which surface water comes should have no human habitations located above the intake. No campers should be allowed at any season of the year and, so far as possible, human beings should be excluded from the area of

the watershed at all times. Farm animals should not be allowed to pasture on the watershed. Watersheds protected in this manner will be normally free from all forms of dangerous contamination and the water delivered from such an area to a drainage channel can be safely recommended for public consumption.

Intakes Below Habitations: It follows, therefore, that when the intake of a city water system is located below human habitations, conditions are introduced which require special attention. When there are farm habitations, on the watershed which supplies the water for a given stream used for domestic purposes, an element of risk is introduced, in that there is a possibility of contamination reaching the water. There is likewise danger when campers are allowed to establish camps on the banks of such a stream. The risk introduced in cases of this kind depends primarily on the possibility that excreta may enter the water supply and contaminate it. It is a difficult matter to establish any method of rating or estimating the risk introduced. This element is such an uncertain factor that many sanitarians will not recommend a surface water for public consumption if the same is derived from a watershed or from a stream on either of which there are any considerable number of human habitations, unless the most strict police regulations are in force. Many sanitarians will not recommend an untreated surface water for public consumption unless the water is delivered to the intake above all human habitations, including farms, camps, villages, and other possible sources of contamination. This is a safe standard and reduces to a minimum the risk that is assumed by the public when using a water supply that does not conform to the above standard.

When a sanitary survey and a laboratory investigation of a given source of surface water indicates that the elements of risk observed are such as to cast suspicion on the sanitary qualities of the water, one of the following measures can be adopted:

1. The water supply under suspicion could be abandoned and the intake changed to a source of water above human habitations and other sources of contamination.

2. Complete control of the watershed and streams supplying the water could, in some cases, be obtained by purchase of a sufficient area of ground. The habitations and other sources of contamination could then be removed.

3. The sanitary conditions on any given watershed and on the banks of streams supplying the water could be controlled to a greater or less extent by proper policing. The work must be thoroughly performed if proper protection is to be secured.

4. The water under question could be purified by a proper combination of the following methods:

(a) Storage and sedimentation.

(b) Sand filtration.
   1. Slow sand.
   2. Mechanical.

(c) Disinfection.
   1. Calcium hypochlorite.
   2. Liquid chlorine.

Ground Waters.

Protection of Wells: It should be understood that ground water in a region where the soil has never been contaminated by human or animal excreta is free from germs that cause water-borne diseases. When wells are first used in such a region the water delivered is satisfactory from the sanitary aspect. Naturally, some ground waters are not suitable for drinking on account of a high alkali content.

If a ground water is to be kept in its original state of purity, two things are necessary:

First. Scientific methods of sewage disposal must be adopted to prevent soil contamination.

Second. Wells must be properly constructed so as to prevent pollution by surface drainage and infiltration.

UNSETTLED QUESTION.

Father (impressively)—Suppose I should be taken away suddenly, what would become of you, my boy?

Irreverent Son—I'd stay here. The question is, what would be come of you?

MEDITATIONS ON AN OLD STORY.

That's a sort of gruesome story 'bout the spider and the fly,
And I used to think I'd like to smash the spider in the eye,
'Cause he seemed to be a-dealin' from a deck hid in his sleeve
And there simply wasn't nothin' for the fly to do but grieve.

Now, I hold that when you're settin' in a game as man to man
You should play it plumb through honest, same as when the game began;
So it seemed quite some suspicious when the spider showed his smile
And this Mister Fly invited to come in and rest awhile.

But we're gettin' information 'bout this seemin' humble fly,
And we've mighty nigh concluded 'bout his fate we shouldn't cry,
For the science sharps all tell us that in spreadin' of disease
This here fly's an expert spreader—he's the king pin, if you please.

He's a scavenger by birthright, and he scavenges all day,
And he ain't in any union, so he'll work the night away;
When he comes on you a-callin' he don't never lift his hat
And the little cuss won't even wipe his feet off on the mat.

So, because he's been a-diggin' in the garbage and the trash,
He's most like to make a bee-line for your trusty plate of hash!
There he gently scrapes his footsies on the food—he's done the trick!
And the further you go eatin', why, the worser you get sick.

Now, the fly he's not partic'lar where his loaded feet may rest;
Be it porterhouse or weiner, he will camp on worst or best;
He's a germ-disseminator, and he's not the least bit shy,
And he's set the Nation yelling: "Don't forget to swat the fly!"

But we needn't put the burden altogether on the pest.
We can minimize the danger if we heed the plain behest,
We can close the can of garbage, we can burn up all the stuff,
Till to keep his life a-goin' Mister Fly can't find enough.

Life is real, life is earnest, and to keep it's worth a fight,
And the man who doesn't struggle—why, he really ain't right
bright;
Everyone should do his duty, and his duty's just as plain:
Join the Longer-Livin' Legion in a grand Clean-Up Campaign.

Now, I never loved the spider, though he's quite a wise old
guy,
But I say to him emphatic: "You are welcome to the fly!"
I'm a-goin' to do my little on this comin' Clean-Up Day
So the Germ disseminators must go elsewhere for to play!

—WILL AIKEN.

Helena, Mont., April 2d, 1916.

NOVEL DEATH TEST.

Two Irishmen were working on the roof of a building one day when one made a misstep and fell to the ground. The other leaned over and called:

"Are yez dead or alive, Mike?"

"O'im alive," said Mike, feebly.

"Sure you're such a liar, Oi don't know whether to belave yez or not."

"Well, then, Oi must be dead," said Mike, "for yez would never dare to call me a liar of Oi wor alive."—Philadelphia Record.

THE HOUSE FLY IN RELATION TO PUBLIC HEALTH IN MONTANA.

Article 2. The House Fly as a Disease Carrier.

By R. R. Parker.

In the previous article of this series it was explained that preventive medicine had to do with the prevention of disease. There are 600,000 deaths annually in the United States from diseases which are preventable. All diseases, the germs of which are carried by the house fly, are of this character. As far as this insect is concerned, therefore, two fundamental means of preventing such disease are indicated, —first to prevent flies from contaminating themselves by controlling the sources of contamination and second, to control the flies. How these two principles may be applied will be fully explained in Article 3.

In discussing the house fly as a disease carrier, we must first understand the means by which flies carry disease germs. These were indicated when considering the habits of this pest. There are three ways and they result either in contaminating our food or our bodies. Filth of all sorts over which the fly walks when feeding or depositing its eggs cling to the hairs on its legs and body and is afterward scraped off on food in stores or in our homes, and on our bodies. Disease germs, however, are not only carried on the outside of the fly, but also in the intestine. This results in two more sources of bacteria. (1) Fly specks, which the flies deposit when emptying their intestines are prolific sources of disease organisms. (2) Perhaps the most disgusting act of the fly is its habit of vomiting up liquid food mixed with saliva which it often does to moisten solid food, such as sugar. "Vomit spots" are commonly seen on the windows. By these three means disease germs are left on our food and in various other places.

Flies will often feed on the fly specks deposited by other flies and may become infected with disease organisms in this way. These, of course, then in turn pass through their intestines and are left in all sorts of places.

Some idea of how immense numbers of disease germs may be distributed in these various ways just described above

may be gained by noting a few of the results of investigation, for instance, flies captured in insanitary portions of cities have been found to carry from 800,000 to 500,000,000 bacteria, a large proportion of which are intestinal germs. In cleaner areas the number of bacteria carried was much smaller—21,000 to 100,000. Flies struggling in milk or other fluids leave many bacteria behind them, even into the hundreds of thousands. Flies captured in places where milk is handled and exposed carry more bacteria than flies captured in other places in the same vicinity, probably due to the flies infecting the milk in which bacteria will multiply in enormous numbers, and then reinfecting themselves, a vicious cycle that is often repeated. Other observations during which flies were examined from dwelling houses showed 75 per cent to have intestinal bacteria in their intestines. This percentage unquestionably would depend on the relative cleanliness of any given locality. Flies that are captured on swill also have large numbers of faecal bacteria in their intestines. Further examples might be given, but these are sufficient to show that flies carry many bacteria both on their bodies and in their intestines and that many of these are of the kind that cause diseases of the human intestines.

It has been shown that flies carry disease organisms in various ways. Further light is thrown on the possibility of infected flies contaminating our food when we consider the frequency with which faecal matter is deposited. It has been demonstrated that after feeding male house flies may deposit 25 fly specks during a period of less than two days before their intestines are empty, female flies may deposit 35. When working with certain other flies the number is still larger, 40 for males and 86 for females. Most of the fly specks are deposited within the first day. When flies are feeding continuously the number of fly specks is even larger and also depends on the kind of food on which they have been feeding. Some substances, such as sputum, cause diarrhoea in the flies and the spects are larger and more frequently deposited. "Vomit spots" may be even more frequently left than faecal matter. Thus we see that after a fly has fed on any substance containing disease germs that these germs may be left in a great many different localities during the wanderings of the fly during the next one or two days and sometimes longer, but flies are not at all careful

in choosing the places where they leave their filth and human food in stores, and houses serve their convenience as well as any other place or substance. The writer has often referred to flies as the most active living agent in the spread of disease germs, except perhaps man himself. It may be that they are even the most active during the season in which they are abundant. For example, let us suppose that a consumptive spits on the sidewalk. Man has performed his part and left infected material in **one** place, but flies are especially attracted to tuberculous sputum. If only a single fly fed on it, this fly could easily by means of "vomit spots" and fly specks leave the germs in at least half a hundred different places during the next two days, but that only one fly would visit the sputum would be very improbable, more likely several hundred might regale themselves on this choice morsel so that infected material originally deposited in one spot may be spread to several hundred places over a considerable area, and when we think of our open privies and garbage dumps which contain large quantities of filth and which are so often left exposed to be visited by incredible numbers of flies, what wonder is it that flies which frequent both these places and the food in our homes are deemed one of man's worst enemies. Indeed, it is with but a small measure of self respect that we can view ourselves when we permit such conditions to exist.

Not only do flies frequent and feed on such filth, but they breed in it as well. A single neglected garbage pile or privy may breed hundreds or thousands of flies.

In towns where people store their water in barrels the water may easily become infected by the flies which go to them for water. This is especially true when flies fall into the water, their struggles releasing large numbers of bacteria from the surface of their bodies.

Another important consideration in the spread of disease organisms by flies is the distances which they travel. To determine just how important this question is in Montana, the State Board of Entomology carried on investigations at Miles City during the summer of 1915 and it was demonstrated that flies which breed out from a manure pile or any other suitable substance will spread to every part of a city of equivalent size in about two weeks. Flies may travel at least two miles in any direction from their breeding place.

We have but few cities in Montana so large but that any person who permits flies to breed on his premises is guilty of furnishing a continual supply of these pests for the benefit of every one of his fellow townspeople. Not only does he furnish flies, but in every fly he furnishes an active agent for spreading disease germs. These organisms of various diseases will live from several days to two weeks on the body of a fly and hence, may be left on food at long distances from their original source.

It is hard in the light of all this evidence, to find any redeeming features in the house fly and its kin. If it has any, it is to be found in the often-suggested fact, that, by its numbers, it furnishes an index to sanitary conditions. Flies cannot exist without filth in which to breed, hence. if we find no flies in a town we are reasonably certain that the waste production is cared for in a decent and sanitary manner. Conversely, where flies abound, filth is sure to be correspondingly plentiful.

All the evidence points to house flies, in our climate at least, as being particularly concerned in the transmission of intestional diseases and diseases which may have their origin from the intestine. It is apparent that this fact, which is well recognized, agrees with what we have learned about the fly and its habits. It frequents and feeds both on faecal matter and other substances which contain intestinal bacteria and on human food which we take into our stomachs. Nothing could be more logical and convincing. The diseases which particularly concern us in Montana at the present time are typhoid fever, summer diarrhoea (also known as infantile diarrhoea and sometimes as cholera infantum) and tuberculosis.

Typhoid Fever. Perhaps this disease, which is considered by some to be equally a scourage with consumption in this country, has received the most attention as a house-fly-borne-disease because the conditions incidental to it are extremely favorable for fly transmission. The germ of typhoid is found in the stools and urine of those infected and may be present in them for months and even years after the patient has recovered. Persons who thus pass the typhoid germs for long periods after recovery are known as "typhoid carriers." In some localities at least four per cent of typhoid patients have been shown to be persistent carriers

of the disease germ. In asylums and public institutions of similar character such persons are often found. What wonder then, knowing the filth-to-food habit of flies that they have ranked next to water and milk in the spread of this disease. Under some conditions, such as concentration camps, they have even been recognized as the agent of first importance. Such was the decision of the Commission appointed to study typhoid fever in our army camps at the time of the Spanish-American War. Great Britain went through the same experience during the South African campaign. The success of Japan against Russia has been partly attributed to the attention given to sanitary details of this nature.

In cities, however, there is far less excuse for the spread of typhoid by flies. With the improvements of the sewage system and the passing of the outdoor privy the danger from this source under city conditions may be reduced to unimportance if proper care and foresight are used. In our cities and towns in Montana, however, either systems of sewage disposal are entirely lacking or are only partly utilized and the privy is everywhere in evidence even in some of the largest cities. This must needs be so in many cases. Small towns must rely on the privy and cities commonly extend their sewer systems as their funds permit, but at least we can make our privies fly proof and properly treat their contents so that danger of contagion will be reduced to a minimum.

Flies have been shown in some instances to be responsible for typhoid epidemics through the inoculation of milk at dairies where they had access, both to the milk and to infected stools in open privies. This indicates the importance of maintaining sanitary conditions in the country is the source of so much of our food.

On the supposition that one case of typhoid fever in every five is caused by fly transmission, it was estimated in 1913 that the annual economic loss through this agency was $70,000,000, in the United States.

Summer Diarrhoea. Of equal, if not even greater importance, is the apparent guilt of the house fly in the spread of summer diarrhoea. How many helpless babies die each year, victims of this common malady, through pure neglect to provide clean conditions under which to bring them up. In 1908 nearly 200,000 children under five years of age died in the registration area of the United States, and of these more than 50,000 died of epidemic diarrhoea. This is only a record of fatal cases, but the number of children actually

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sick with this disease would have been vastly in excess of the figures given. In older people the effects of the disease are not so serious and it does not attract such widespread attention. In New York City it has been shown that the advent of sanitary conditions demanded for the control of the house fly has brought about a marked decrease of this disease.

Flies which have walked over or fed upon infected stools may transmit the disease by feeding on milk or other food which is to be fed to the baby and by contaminating the nipple of the nursing bottle. Fly specks and "vomit spots" containing the germ may be rubbed from window panes on the fingers and transferred to the mouth.

Consumption. This disease is caused by a germ which may be found in every part of the body and are perhaps most commonly in the lungs, intestines, liver and urinary system. From the standpoint of fly transmission the resistance of the germ to adverse conditions is important. In the dried sputum they may remain alive for months and for several weeks in sputum that is allowed to putrify. Even in the sunlight, which is a very active agent in killing germs, they may live for a day. Since the germ of consumption is eliminated from the body in three ways; in the sputum, stools and urine, the possibility of flies becoming contaminated is only too evident. Flies in hospitals where this disease is treated have been found to deposit the germ in the fly spects in large numbers and animals fed on food which such flies polluted have died of this diseease. Flies may carry the germ in their intestines for several days and infect food at considerable distances from the point where they became contaminated. How important the possibility of fly transmission is may be judged from the fact that the "vast majority of all cases of lung tuberculosis are of intestinal origin and there is no doubt that pulmonary tuberculosis can originate by swallowing tubercle bacilli." Perhaps one case of consumption in every twenty is due to transmission by flies.

Though the diseases which have just been briefly discussed are the most important to us in Montana, there are others in the spread of which the house fly may either play an important part or which it is suspected may occasionally be fly-borne. Among these are dysentery, cholera, smallpox, measels, erysipelas, anthrax, glanders, diptheria, leprosy and venereal diseases.

Flies of various sorts are also sometimes found in the cavities of the nose and ear and not uncommonly in such cases the results are very serious. Sometimes fly eggs or maggots are taken into the intestines with food or again enter by other means and cause serious disturbances. These infestations are usually due to uncleanly habits with respect to the body or the case of food.